Aerial conflicts: Drone regulation and gaps in spatial protection

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Introduction

Drones have undoubtedly arrived in New Zealand landscapes, but less apparent is that adequate regulatory responses have accompanied them. The purpose of this article is to examine the adequacy of New Zealand law and policy in managing the adverse environmental effects of Remotely Piloted Aircraft (RPA). Currently regulated by the Civil Aviation Act 1990 (CAA 1990) and associated aviation rules, it is argued that this approach fails to sufficiently capture all potential adverse effects. As a result of exemptions for overflying aircraft the Resource Management Act 1991 (RMA), the principal legislation governing resource use in the New Zealand environment, is unable to fill the breach. Instead, the CAA 1990 framework applies, rendering an inconsistent regulatory approach exacerbated by rules which rest operational control largely in the hands of property owners. In this manner, opportunity to comprehensively manage spatial conflicts is reduced and spatial protection from potential effects is compromised. A better approach is to include RPA operations within the ambit of the RMA, enabling a permissive regime with appropriate controls to manage potential land use/ spatial conflicts.

Remotely Piloted Aircraft

RPA is a term for a group of electronically controlled aerial vehicles including drones, and unmanned aerial vehicles or systems (UAV, UAS). Used in a wide range of military, commercial and recreational applications, RPA vary from 4-tonne military unmanned drone planes to tiny lightweight pieces not much larger than a dragonfly. Emergent in New Zealand airspace, the presence of drones is picking up pace driven by rapidly burgeoning recreational and commercial markets. Defined as "aircraft", overflying RPA are largely exempted from control under the RMA and this article argues that the approach requires rectifying. In *Dome Valley District Residents Soc Inc v Rodney District Council* [2008] 3 NZLR 821 at [40] Priestley J observed that a reading of s 9(8) (now s 9(5)) of the RMA "suggests that a territorial authority's power to regulate or restrict overflying aircraft is solely limited to noise emission controls for airport use". In discussing the rationale for this exemption, and in relation to s 12(5) which essentially reproduces the position in the coastal marine area, Priestley J stated:

> [42] Such a restriction on territorial authorities makes sense. The Resource Management Act does not empower local bodies to attempt to regulate the noise emitted by aircraft flying between two points within New Zealand or aircraft flying on international routes through New Zealand's air space. It would be a nonsense to suggest that local bodies lying underneath the route of an aircraft flying from Auckland to Christchurch or from Santiago to Melbourne were empowered to impose noise, or any other restrictions.
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> [43] It is also obvious that, for all practical purposes, an overflying aircraft has absolutely nothing to do with land use. Nor has a land owner or occupier any control over the random and momentary intrusion of an aircraft into his or her air space.

Clearly an argument with merit as it relates to overflying aircraft, the question that this article raises is whether such reasoning is equally applicable to RPA. In particular, to those used in commercial and recreational applications, launched from various terrestrial and coastal vantage points and flown at low altitude and in airspace commonly occupied for multiple purposes.

Effects of RPA

Privacy, and human health and safety have constituted the key concerns in relation to the operation of RPA in the environment. However, as RPA operation intensifies in the environment and potential applications and modes of deployment proliferate, opportunities for new forms of conflict emerge. Drone racing and firefighting in swarms, Amazon postal delivery, commercial applications of fertiliser and agrichemicals, photogrammetry for environmental management, image capture for sporting events and real estate sales, wildlife monitoring, bird watching and recreational flight indicate new opportunities for RPA users. Flight at low altitude, manoeuvrability and proximity to subject are characteristics of RPA deployment. These applications suggest significant intensification of the use of airspace in contrast to more traditional uses and the potential for novel forms of resource use conflict.

For humans, in addition to privacy, and health and safety concerns, RPA operation has the potential to generate nuisance effects which disturb human use and enjoyment of the environment. Noise, special audible characteristics and visual impacts are potential adverse effects from RPA operation, issues which intensify where RPA agglomerate. The extent of such effects is neither clear nor well researched. The technology is emergent in the landscape, varies in form and capability and further, effects generated may be dependent on the nature of the receiving environment. However, the potential for nuisance effects suggests a need to condition the use of RPA in sensitive environments (see for example: Simon Maude "Noisy drones annoy walkers" *North Shore Times* (online ed, Auckland, 23 December 2014).

Impacts to the non-human environment are also indicated with recent research identifying the propensity to disturb wildlife. Disturbance, in these terms, is the behavioural or physiological response of an animal to the presence of stimuli, such as a potential predator, or an anthropogenic source, such as people or vehicles (AN van der Zande and TJ Verstrael "Impacts of outdoor recreation upon nest-site choice and breeding success of the kestrel *Falco tinnunculus*" (1985) 73 Ardea 90; MA Weston and others "A review of flight-initiation distances and their application to managing disturbance to Australian birds" (2012) 112 Emu 269).

Despite indications that RPA may provide additional capability in wildlife monitoring and management, other research suggests that care is required in deployment to prevent adverse disturbance impacts (M-C Rümmler and others "Measuring The Influence of Unmanned Aerial Vehicles on Adélie Penguins" (2016) 39 Polar Biology 1329 (Adelie Penguin); Mark A Ditmer and others "Bears Show a Physiological but Limited Behavioral Response to Unmanned Aerial Vehicles" (2015) 25 Current Biology 2278 (Black Bears); Sergio A Lambertucci, Emily LC Shepard and Rory P Wilson "Human-Wildlife Conflicts in a Crowded Airspace" (2015) 348 Science 502 (seagulls and raptors)). The potential for disturbance is attributed to the low altitude presence, noise and prevalence of RPA. The following sections will now consider the extent to which New Zealand law can constrain environmental effects of RPA operation.

Regulation of RPA

The CAA 1990 governs aircraft and in defining these, under s 2, adopts the same broad definition as the RMA:

> [A]ircraft means any machine that can derive support in the atmosphere from the reactions of the air otherwise than by the reactions of the air against the surface of the earth.

A principal purpose of the CAA 1990, as described in the long title, is the promotion of aviation safety. At its inception the Act did not contemplate RPA, which were then a relatively unknown phenomenon. With the technological landscape shifting significantly in recent years, rules to address this gap and govern the operation of RPA were introduced in 2015. Civil Aviation Rules 2015 (the Rules), pts 101 and 102, regulate RPA Systems (an official International Civil Aviation Organization term for aircraft, which includes RPA, Unmanned Aerial Systems and drones).

With a focus on hazard control and limiting damage to person and property, the reach of the Rules in governing wider adverse effects is limited. Using aircraft weight as a determining characteristic, the Rules divide RPA into two broad categories based on the threshold weight of 25kg. Part 101 applies to RPA of 25kg and under, which covers most of the drones on the New Zealand market and currently in use for commercial and recreational purposes. Accordingly, pt 101 is presently the dominant control for RPA use in New Zealand. Where an operation complies with all aspects of pt 101 no further authorisation is required under the Rules. If an operation is non-compliant with pt 101 or an aircraft exceeds 25kg the operator must be certificated under pt 102. Part 102 is directed at the identification and control

of hazards associated with RPA use, and is designed to secure tighter control upon these aspects.

Property owner consent

Operational controls imposed upon RPA operators under pt 101 are directed towards minimising hazards to persons, property and other aircraft (rr 101.7–11,101.13, 101.209, 101.211, 101.207(a)(3)). Protection of personal privacy and property rights is afforded through a requirement for consent to fly above any person and consent from the property owner or occupier to fly above property (rr 101.207(a)(1)(i-ii)). This is further reinforced by requirements for operators to maintain visual line of sight with the aircraft (r 101.209).

Rule 101.207(a) provides:

> 101.207 Airspace
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> (a) A person operating a remotely piloted aircraft must—
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> (1) unless operating in a danger area under Part 71, avoid operating—
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> (i) in airspace above persons who have not given consent for the aircraft to operate in that airspace; and
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> (ii) above property unless prior consent has been obtained from any persons occupying that property or the property owner; and
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> (2) maintain observation of the surrounding airspace in which the aircraft is operating for other aircraft; and
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> (3) not operate the aircraft at any height above 400 feet above ground level except in accordance with paragraph (c)."

These requirements focus upon on-site effects to humans, but do not extend to the potential for effects beyond the boundary of the property on which the RPA is operated, except to the extent that an RPA flies above a person. The requirement for consent to fly above a person does not appear to extend to space adjacent or proximate to a person. Nor do the rules contemplate adverse impacts to non-human subjects, such as wildlife. Furthermore, in electing weight as the governing factor in class, the ability to scrutinise operational factors, such as flying height, velocity, and take-off weight compared to maximum thrust and rotor velocity (which influence stability and noise), is also limited.

As a result of the schema of the Rules the practical consequence is that property owner consent becomes the key mechanism to limit or condition RPA operations under pt 101. The reason advanced for resting control in this manner is that property owners are best placed to identify hazards on the property and people affected by the operation (Civil Aviation Authority "Unmanned Aircraft Fact Sheet 1; Consent Rule 101.207(a): for Regional Councils & Territorial Authorities" (2012)).

This method equates to a narrow approach to protection from trespass to land (and low altitude airspace) and protection of property owners and occupiers from nuisance effects, but no others. The Rules do not contemplate RPA impact upon neighbouring activities nor upon non-human species, and in the absence of direction or guidance in this regard, reliance upon landowner consent is an inadequate mechanism to identify and manage any potential threats.

Local authorities have been encouraged by the Civil Aviation Authority to develop policy on RPA activity in public places, and to make this information available to the public on local authority websites (Civil Aviation Authority 1990). However, an examination of agency approach to consent on public land reveals a significantly inconsistent approach to the use of public space by RPA, with scant consideration of impacts to the non-human environment, as discussed below.

Who is the "Property Owner"?

An initial consideration is the nature of "property", and the issue of whether the Rules are confined to real property. Although s 57(3) of the Wildlife Act 1953 makes wildlife the property of the Crown, a straightforward reading of the Rules suggests that the property contemplated is property capable of being occupied, therefore not including wildlife.

The next problem is the meaning of "property owner" from whom consent must be sought under r 101.207. Undefined in both the CAA 1990 and the Rules the position is unclear. Civil Aviation Authority guidance on the scope of the consent rule advises that reference to "property" owners or occupiers "obviously includes the legal property owner or occupier, but in the case of public spaces, is being interpreted to include the agency responsible for managing, controlling or otherwise administering property" (Civil Aviation Authority 2015). For RPA operators wanting to fly RPA in public areas, this description is unhelpful and potentially obscures identification of the responsible agency and may reduce access to operational constraints.

Identification of responsible agencies may be reasonably straightforward for council parks and reserves, but less clear with open space areas, such as the common marine and coastal area (cmca), which is explicitly excluded from ownership by s 11(2) the Marine and Coastal Area (Takutai Moana) Act 2011. Multiple agencies have functions of administrative control in relation to public coastal spaces, with few having any form of responsibility for aircraft. The cmca is characterised by significant numbers of threatened species and considerable pressures from human use and development (Wallace, P "Managing human disturbance of wildlife in coastal areas" 2016 72 New Zealand Geographer 133-143). Greater clarity as to agency responsibility is required in relation to this area, and further direction in relation to the Exclusive Economic Zone would also be of benefit.

Policy for public spaces

As "property owners" public authorities have the opportunity to set policy to condition RPA operation on agency owned/administered property in a more sustained and comprehensive manner than would apply on private land. Control of RPA activity on the public conservation estate is relatively comprehensive, as the policy of the Department of Conservation is to require a concession under the Conservation Act 1987 for all RPA activity. In guidance material, wildlife disturbance and disturbance to other users of land are identified as concerns to be addressed via the concession process (Department of Conservation "Aircraft activity" (2015) <http://www.doc.govt.nz/get-involved/apply-for-permits/business-or-activity/aircraft-activities/#drones>). However, these restrictions apply only to the public conservation estate administered by the Department as opposed to all areas inhabited by sensitive wildlife or other users.

An analysis of local authorities reveals that policy approaches to RPA operations on property owned/administered as documented on agency websites vary significantly. Of 66 territorial authorities (including five unitary authorities), 29 had no guidance and 37 had some RPA guidelines. Of these, only five specified rules or criteria relating to proximity to wildlife or habitats. Similarly, of 16 regional authorities, 10 had no guidance and six had some guidance, with only two relating in some way to wildlife. This is not a satisfactory position for wildlife protection in public areas, and demonstrates a problem that requires rectification.

Private land and property owner consent

On private land no policy directs the conditioning of property owner consent or constrains operator activity in relation to adverse environmental effects beyond the concerns of the property owner. Without direction, it is likely that any consequences for neighbouring activities or for wildlife from RPA operation will not be subject to scrutiny.

In addition, private landowners may lack the skills and experience to successfully identify the presence of sensitive wildlife on the land, or to inform successful management protocols/operational constraints to condition the consent. Similarly, they may lack awareness of the potential for effects of RPA operations upon neighbours. Placing control of operations in the hands of property owners is ironic when juxtaposed against the lack of relationship rationale of Priestley J in Dome Valley for exemption of aircraft from the RMA. Here, for all practical purposes overflying RPA are closely connected to land use, particularly given r 101.207(a)(3) which limits flight altitude to a height below 400 ft., and the line of sight requirement previously mentioned. Furthermore, the land owner has (in contrast to the aircraft referred to by Priestley J) significant "control over the random and momentary intrusion of an aircraft into his or her air space". RPA activity exhibits fundamental differences to archetypal aircraft activity. Distinguished by remote operation from terrestrial vantage points (or from vessels in the marine environment), short flight times correlated to battery life, regular flight return to points on the ground, and low altitude flight in close proximity to a subject of interest, the effects of RPA on the environment are also fundamentally different.

The RMA and RPAs

Bringing RPA within the scheme of the RMA would provide a more effective and integrated approach to regulating the adverse effects of RPA operation. The RMA is designed to enable resource use and development in the environment consistent with the purpose of sustainable management as outlined in s 5. Regulation of the use of land, includes the airspace above land (s 2), and likewise, regulation of the coastal marine area includes the airspace above that area as further defined by s 2. In this way the existing RMA scheme could readily incorporate management of RPA within established framework. *Dome Valley* is authority for the proposition that use of airspace by overflying aircraft is not a use of land,

but the connection of RPA to the land gives reason to reconsider this approach in the case of RPA. In *Dome Valley* the Court in reference to aircraft intrusion in airspace held:

> [60] Next, once airborne and lawfully flying above land owned by a person or under a territorial authority's jurisdiction, it is a nonsense to suggest the aircraft is somehow engaged in a s 9(1) "use of land". In particular the action of an overflying aircraft is clearly not caught by the s 9(4) definition of "use" which is terrestrially based.
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> ...
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> [66] As in so many areas of the law, arbitrary lines have to be drawn. The issue of whether land can be used for an airport, aerodrome, or heliport is a resource consent issue. So too, clearly in terms of s 9(8) and other provisions, is the issue of control of noise emission generated by an airport. But after take off or landing, and in particular where an aircraft is operating above 500 feet over a rural area or above a thousand feet over a congested area, such aircraft and its effects, in my judgment lie outside the ambit of the Act and the resource consent process.

The reasoning applied here does not so readily extend to RPA operation. In addition, consideration needs to be given to the meaning of "overflying". Does the close connection of RPA to the land, and the ability of common RPA (such as quadcopters) to orientate vertically and horizontally and to pitch, roll, yaw and hover in close proximity to a subject fit the definition of overflight?

The RMA presents an opportunity to scrutinise activity through requirement for resource consent (pt 6) where significant effects arise, and to apply plan provisions which protect sensitive habitat, including airspace, and prevent other potential resource use conflicts. As the number of RPA operating in the environment intensifies, protective air zones for a range of purposes are likely to become necessary. Research suggests that tools regulating approach distances to wildlife, including those based on flight initiation distances, may be effective measures to limit harm from disturbance effects (Weston 2012). Similar "setback mechanisms" may also be useful for sensitive activities proximate to an RPA operation. District plans and regional coastal plans (ss 72 and 64 of the RMA) represent potentially effective mechanisms for implementation of such measures. Concern that regulation will stifle innovative applications of the technology can be met by the potential for RPA operations to be managed as permitted activities where necessary criteria are met. Only inappropriate applications in areas sensitive to RPA operation would require further scrutiny. Where RPA are involved in release of contaminants, such as agrichemicals, in a manner that constitutes a discharge under s 15 of the RMA, bringing the entire operation within the RMA enables comprehensive consideration of the activity.

Existing agency functions and protocols enable efficient, integrated regulation without unnecessary duplication. Civil Aviation Authority guidance provides the rationale for council control of RPA operation on council property that councils "better understand local conditions" (Civil Aviation Authority 2015). The guidance elucidates (Civil Aviation Authority 2015):

> Local authorities and the Department of Conservation (DoC) are best placed to understand the specific risks associated with RPAS-use in their territory. They are therefore best placed to engage with operators and provide the necessary consent. This allows consideration of mixed or conflicting land uses in a way that the CAA would never be able to do. Local authorities and DoC will also be best placed to transfer knowledge of the risks posed to or by and RPAS operation to other users of public spaces, or conflicting imperatives of the council.

That undoubtedly is also a sound reason for bringing control under the RMA, but for the purpose of managing the activity comprehensively across all environments rather than upon council property alone. The issue of wildlife disturbance is but one example of the potential conflicts between RPA and land use in the environment, and it seems likely that other conflicts will emerge as RPA operation intensifies. The current piecemeal approach to wildlife disturbance by local authorities suggests that a stronger and more comprehensive approach to the phenomenon is required in both public spaces and upon private land. Aviation safety and related matters could continue to be managed under the CAA 1990 in conjunction with other aircraft.

Further impetus for inclusion of RPA within the ambit of the RMA may also be found in deficiencies in the Wildlife Act 1953, the legislation intended to provide absolute protection for New Zealand wildlife. I have analysed and discussed these deficiencies elsewhere (Wallace 2016; P Wallace and S Fluker "Protection of Threatened Species in New Zealand" (2015) 19 New Zealand Journal of Environmental Law 179). Weak on a range of fronts, the Wildlife Act 1953 provides limited protection from disturbance,

particularly as it relates to disturbance incidental to lawful activity.

Conclusion

This article advocates that greater consideration be given to the potential of RPAs to generate environmental effects beyond the concerns of human health and safety, and damage to property. Distinguished by form and function, RPA effects are fundamentally different to those of traditional aircraft. It is argued that the current arrangements of the law are insufficiently robust to manage environmental conflicts in progressively congested airspace. RPA operations are constrained by pts 101 and 102 of the Rules; however, reliance upon property owner consent limits opportunity to respond to potential conflicts, such as wildlife disturbance and nuisance effects to proximate users. An integrated approach would see RPA distinguished from traditional aircraft in overflight and brought within the ambit of the RMA, to enable the development of consistent policy and implementation methods to more effectively manage the use of airspace. In the alternative the Rules require revision to better manage potential nuisance effects. ■